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3. Full name, address and postcode of the or of each applicant (underline all surnames)

GlaxoSmithKline Consumer Healthcare GmbH & Co KG
Bussmatten 1, D-77815 Buehl (Baden), Germany

Patents ADP number (if you know it) 8304701001

If the applicant is a corporate body, give the country/state of its incorporation

German

4. Title of the invention

Toothbrush

5. Name of your agent (if you have one)

Corporate Intellectual Property

"Address for service" in the United Kingdom to which all correspondence should be sent
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Corporate Intellectual Property (CN9 25.1)
980 Great West Road
BRENTFORD
Middlesex TW8 9GS

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Continuation sheets of this form
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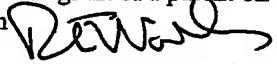
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We request the grant of a patent on the basis of this application

Signature  Date 7-Nov-02
R F Walker

12. Name and daytime telephone number of person to contact in the United Kingdom

R F Walker 020 80474485

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Toothbrush

This invention relates to toothbrush heads, in particular to toothbrush heads comprising plural sections which can bend under the pressures of toothbrushing. The 5 invention also relates to a toothbrush provided with such a head.

Toothbrushes generally comprise a grip handle by which a user may hold the toothbrush and a bristle-carrying head, the head and handle being disposed along a longitudinal head-handle direction. Sometimes the head is replaceably connectable to the handle.

10 It is known to provide the head in the form of plural sections disposed widthways adjacent across the toothbrush head and being linked together at an end closest to the handle. For example US-A-4, 864,676 discloses a head in the form of three such sections comprising a middle section laterally flanked by two outer sections, the ends of the outer sections remote from the handle forming a partial ring 15 around the end of the middle section. WO-A01/89344 and FR-A-2548528 disclose heads comprising two such sections of which adjacent surfaces are of a complementary interlocking shape. US-A-4,472,853 discloses a head comprising three widthways adjacent flexible arms each having a bristle carrying pad at its extremity remote from the handle.

20 The purpose of such toothbrush heads comprising side by side sections able to bend in response to toothbrushing pressures is to improve the effectiveness of the head in reaching gaps between the teeth, particularly to achieve this improvement without application of excessive brushing pressures to the teeth, to distribute brushing pressures between the teeth and gums, and to allow a flow of water through the head 25 so that the head may be thoroughly cleaned of for example excess toothpaste, debris etc. after use.

It is an object of this invention to provide an improved toothbrush of the above-mentioned type. Other objects and advantages of this invention will be apparent from the following description.

30 According to this invention a toothbrush head, being connected or connectable to a toothbrush grip handle to thereby define a head-handle longitudinal direction with a perpendicular width direction is provided, the head having a tip end longitudinally

remote from the handle, and comprising three widthways adjacent, longitudinally extending bristle-carrying sections being a middle section and a lateral section on each widthways side of the middle section, one or more section being resiliently flexibly connected to the grip handle, and

5 wherein the middle section extends across the entire width of the toothbrush head adjacent to the tip end.

Preferably the head comprises only three such sections, i.e. a middle section and two lateral sections. Preferably two or more, preferably all of the sections, are flexibly linked to the grip handle. Preferably the one or more section is resiliently 10 flexible under pressure applied in a direction perpendicular to both the longitudinal and width directions. For example the section may be resiliently bent out of a plane parallel to the longitudinal and width directions.

For example the section may be made of a resilient material integral with the 15 grip handle of the toothbrush. For example two or more of the sections may be connected, e.g. integrally, to each other and/or to the toothbrush handle, at a part of the toothbrush remote from the tip end of the head.

The end of the middle section adjacent to the tip end of the head may be integrally enlarged to comprise a bristle-carrying pad adjacent to the tip end of the head and which extends across the entire width of the toothbrush head adjacent to the 20 tip end. The middle section may therefore comprise a widthways narrow section extending from the base end of the head toward the tip end of the head from the direction of the handle and enlarging widthways adjacent to the tip end of the head to form such a pad. Typically such a pad may be approximately of equal dimensions in the widthways and longitudinal directions, e.g. being approximately circular, semi- 25 circular, rectangular or polygonal. Typically in its longitudinal direction such a pad may have a length of ca. 10-50%, e.g. 20-25% of the toothbrush head between its base and tip ends.

Typically such a pad may be of a size suitable to carry a polygonal cluster of 30 bristles, typically disposed in tufts containing plural bristles and extending in a bristle direction generally perpendicular to the longitudinal and width directions. The bristle carrying surface of the middle section may be substantially planar, or undulating, or may be curved e.g. concavely on the side on which the bristles are carried, or the

bristle-carrying surface of such a pad may form an angle of 180° or less, e.g. 180°-160° with the surface, which may also be bristle carrying, of the adjacent part of the section closer to the handle.

5 Similarly the bristle carrying surface of the lateral sections may be substantially planar, or undulating or may be curved e.g. concavely on the side on which the bristles are carried

The widthways adjacent longitudinally extending sides of the sections may be straight linear or alternatively they may be of a complementary interlocking shape, e.g. a complementary sinuous or undulating shape.

10 Each section may carry bristles, which may for example be disposed in one or more longitudinally extending row of tufts of bristles. Bristles may extend in a direction at a perpendicular or non-perpendicular angle to the longitudinal and width directions.

15 One or more section may be resiliently flexible in a widthways outward and inward direction. To avoid excessive outward splay of a lateral section the middle and adjacent lateral section may be provided with abutment parts so that if a lateral section bends outwardly an abutment part of the lateral section abuts against an abutment part of the middle section to limit the extent to which the lateral section can move outwardly. For example an enlarged pad comprising the end of the middle 20 section may have a concavity with an opening facing toward the grip handle and into which an abutment part of a lateral section may fit such that a surface of the concavity comprises a corresponding abutment part.

25 Between widthways adjacent sections there may be an air gap allowing relative movement of the adjacent sections. Alternatively widthways adjacent sections may be in contact, allowing sliding relative movement of the sections, for example in a relative direction perpendicular to both the longitudinal and widthways directions. There may be a flexible material, e.g. an elastomeric material, e.g. a thin flexible web of such a material, between widthways adjacent sections.

30 One or more section may be resiliently flexibly connected to the grip handle in various ways.

For example one or more, e.g. all of the sections may be connected to the grip handle by means of a flexible neck. Such a neck may extend between the base end of

the section, i.e. the end of the section of the head remote from the tip end, and an end of the grip handle which is closest to the head. Typically in such a construction each section of the head may be connected to the grip handle by a respective neck section.

Alternatively one or more, e.g. all of the sections may be flexibly connected,
5 e.g. at the base end of the head, to a neck which extends to the grip handle.

One or more, e.g. all of the sections, may be flexible, for example incorporating resiliently flexible links between longitudinally or widthways adjacent segments of the section.

The toothbrush head of this invention may be integrally made of a resiliently
10 flexible plastic material such as polypropylene, polystyrene etc., as well known for toothbrush manufacture. The head may also be integrally made of such plastic material with the grip handle, and/or with any neck or neck section longitudinally between the head and the grip handle.

The grip handle may be made of a plastic material such as the above, or may
15 also comprise grip-enhancing parts of an elastomeric material, of a generally known type.

The invention will now be described by way of example only with reference to the accompanying drawings which show: -

Fig. 1 Shows a view of a toothbrush having a head of this invention in underside, 20 side and plan.

Figs. 2- 6 Show various perspective, side and plan views of toothbrush heads of this invention.

Referring to Fig. 1 a toothbrush 10 is shown overall in an underside view (1A), side (1B) and plan (1C) views. The toothbrush 10 has a head 11, a grip handle 25 12 disposed along a longitudinal direction L-L, and has a width direction W-W perpendicular to the longitudinal direction. The head 11 has a base end 13 nearest to grip handle 12, and longitudinally between the head 11 and handle 12 is an integral neck 14.

The head 11 is divided into three widthways adjacent sections 15, 16, 17 being 30 a middle section 15 flanked on each widthways side by two lateral sections 16, 17. Each section 15, 16, 17 is elongated parallel to the longitudinal direction L-L.

Adjacent to the tip end 18 of the head 11 the middle section 15 is enlarged into a pad 19 which occupies the entire width of the head 11 adjacent to this tip end 18. As shown in Fig. 1 the pad 19 is generally circular in plan. The middle section 15 therefore comprises a widthways narrow part 15A extending toward the tip end 18 of 5 the head from the direction of the handle 12 and enlarging widthways adjacent to the tip end 18 of the head 11 to form the pad 19. In its longitudinal direction the pad 19 has a length of ca. 25% of the toothbrush head between its base and tip ends.

Bristles 20 extend from the upper surfaces of each of the sections 15, 16 17, in a bristle direction generally perpendicular to both the longitudinal direction L-L and 10 the width direction W-W. The bristles 20 are disposed in discrete tufts. As shown in Fig. 1 the tufts are arranged in rows extending generally widthways across the head, and rows extending generally longitudinally along each section 15, 16 17.

The pad 19 is of a size suitable to carry a polygonal cluster of tufts of bristles 20.

15 Each of the sections 15, 16, 17 is also widthways enlarged at various places e.g. 15B, 16B, 17B to form pads of a width suitable to carry plural widthways adjacent tufts of bristles 20. Consequently, the widthways adjacent sides of adjacent sections 15, 16, 17 are shaped into interlocking corresponding sinuous shapes.

At the base end 13 of the head 11 each of the three sections 15, 16, 17 is 20 integrally formed into a neck section 21, 22, 23 by which it is connected to the grip handle 12. Each neck section 21, 22, 23 is made of resiliently flexible plastic material so that the neck section 21, 22, 23 flexibly and resiliently links its head section 15, 16, 17 to the grip handle 12. The length of each neck section 21, 22, 23 is approximately the same as the length of the head section 15, 16, 17, but may be varied to suit 25 requirements.

The grip handle 12 is of generally conventional construction and design.

In use during toothbrushing, as pressure is applied in the bristle direction to the head 11, each of the sections 15, 16, 17 can independently move resiliently in the 30 arc shown by arrows in Fig. 1B to allow the head 11 to better accommodate itself to the profiles of a user's oral tissues, and to relieve excessive toothbrushing pressure.

Referring to Figs. 2 - 6, alternative constructions of the toothbrush head of this invention are shown.

In Fig. 2 a head similar to that of Fig. 1 is shown enlarged in perspective (2A, 2E, 2F), and in underside (2B), side (2C) and plan (2D) views. It is seen that the bristle surfaces 21 of the lateral sections 16, 17 are of undulating shape as viewed in the width direction W-W, i.e. having upper and lower surfaces of alternating less or 5 more displacement in the bristle direction from a plan parallel to the longitudinal and width directions. On the enlarged parts 15B, 16B tufts of bristles 20 are arranged widthways adjacent. Figs 2E and 2F show the sinuous interlocking shape of widthways adjacent sides of the sections 15, 16, 17.

In Fig. 3 a head 11 is shown enlarged in perspective (3A, 3E, 3F), and in 10 underside (3B), side (3C) and plan (3D) views. The middle section 15 is enlarged at 15B into a widened part between the pad 19 and the base end. The widthways adjacent surfaces of the lateral sections 16, 17 are correspondingly shaped. On the enlarged parts 15B tufts of bristles 20 are arranged widthways adjacent. Fig. 3C shows that the surfaces of the sections 15, 16, 17 from which the bristles 20 extend are 15 gently concave curved in their longitudinal direction., and the surface 19A of the pad 19 forms an angle of 180° with the surface of the adjacent part of section 15.

In Fig. 4 a head similar to that of Fig. 1 is shown enlarged in perspective (4A, 4E), and in underside (4B), side (4C) and plan (4D) views. It is seen that the middle 20 section 15 has a widened part 15B occupying the part of section 15 closer to the handle, and a narrower part 15C between that narrow part 15B and pad 19. Also, which may be independent of other features of Fig. 4, the face 19A of pad 19, from which bristles extend, forms an angle less than 180° with the adjacent face of part 15C from which bristles extend. In Fig. 4 the pad 19 is polygonal, approximately pentagonal, in plan.

25 A similar construction is shown in Fig. 5, except that the face 19A of pad 19, from which bristles extend is coplanar with the adjacent face of part 15C from which bristles extend. Also, independently of this, bristle surfaces 21 of the lateral sections 16, 17 are of undulating shape as viewed in the width direction W-W.

In Fig. 6 a head similar to that of Figs. 2-5 is shown enlarged in perspective 30 (6A), and in underside (6B), side (6C) and plan (6D) views. It is seen that the bristles 20 lean at non-perpendicular angles to the surfaces of the sections 15, 16, 17 from

which they extend, so that as seen in the side view (6B) they are seen to cross. In Fig. 6 the pad 19 is approximately semicircular in plan.

In each of Figs 2-6 the neck sections 21, 22, 23 flexibly connect each section 15, 16, 17 to the grip handle.

Claims:

1. A toothbrush head, being connected or connectable to a toothbrush grip handle to thereby define a head-handle longitudinal direction with a perpendicular width direction is provided, the head having a tip end longitudinally remote from the handle, and comprising three widthways adjacent, longitudinally extending bristle-carrying sections being a middle section and a lateral section on each widthways side of the middle section, one or more section being resiliently flexibly connected to the grip handle, and
5 wherein the middle section extends across the entire width of the toothbrush head adjacent to the tip end.
- 10 2. A toothbrush head according to claim 1 wherein the head comprises only three such sections, being a middle section and two lateral sections.
- 15 3. A toothbrush head according to claim 1 or 2 wherein two or more of the sections are flexibly linked to the grip handle.
- 20 4. A toothbrush head according to claim 3 wherein all of the sections, are flexibly linked to the grip handle.
- 25 5. A toothbrush head according to any one of the preceding claims wherein the one or more section is resiliently flexible under pressure applied in a direction perpendicular to both the longitudinal and width directions.
- 30 6. A toothbrush head according to any one of the preceding claims wherein the end of the middle section adjacent to the tip end of the head is integrally enlarged to comprise a bristle-carrying pad adjacent to the tip end of the head and which extends across the entire width of the toothbrush head adjacent to the tip end.
7. A toothbrush head according to claim 6 wherein the middle section comprises a widthways narrow section extending from the base end of the head toward the tip

end of the head from the direction of the handle and enlarging widthways adjacent to the tip end of the head to form such a pad.

8. A toothbrush head according to claim 6 or 7 wherein the bristle-carrying surface of the pad forms an angle of 180° or less with the surface of the adjacent part of the section closer to the handle.

9. A toothbrush head according to any one of the preceding claims wherein each section carries bristles.

10. A toothbrush head according to any one of the preceding claims wherein one or more section is resiliently flexible in a widthways outward and inward direction.

11. A toothbrush head according to claim 10 wherein the middle and adjacent lateral section are provided with abutment parts so that if a lateral section bends outwardly an abutment part of the lateral section abuts against an abutment part of the middle section to limit the extent to which the lateral section can move outwardly.

12. A toothbrush head according to any one of the preceding claims wherein one or more of the sections is connected to the grip handle by means of a flexible neck.

13. A toothbrush head according to claim 12 wherein each section of the head is connected to the grip handle by a respective neck section.

25 14. A toothbrush provided with a toothbrush head according to any one of the preceding claims.

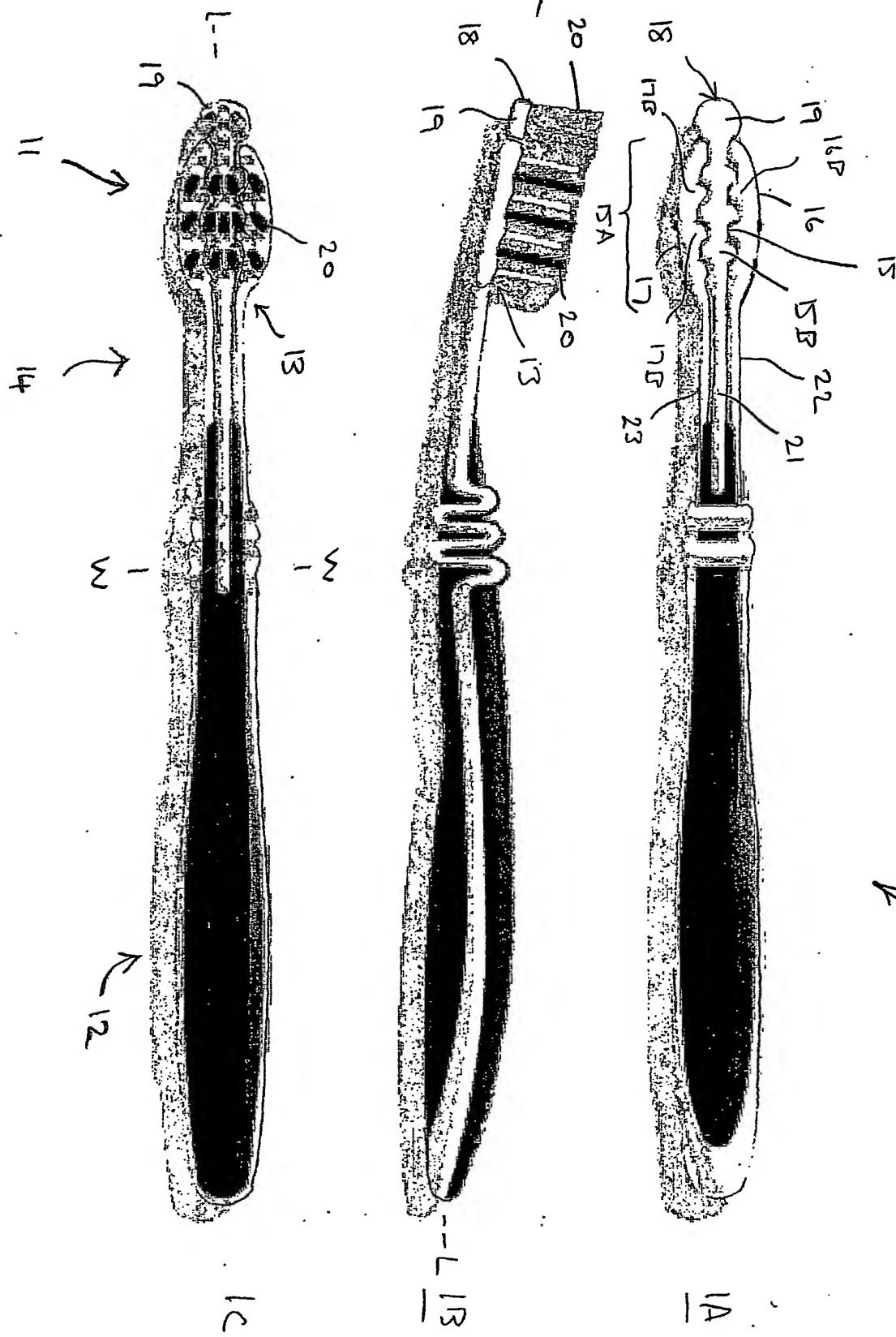
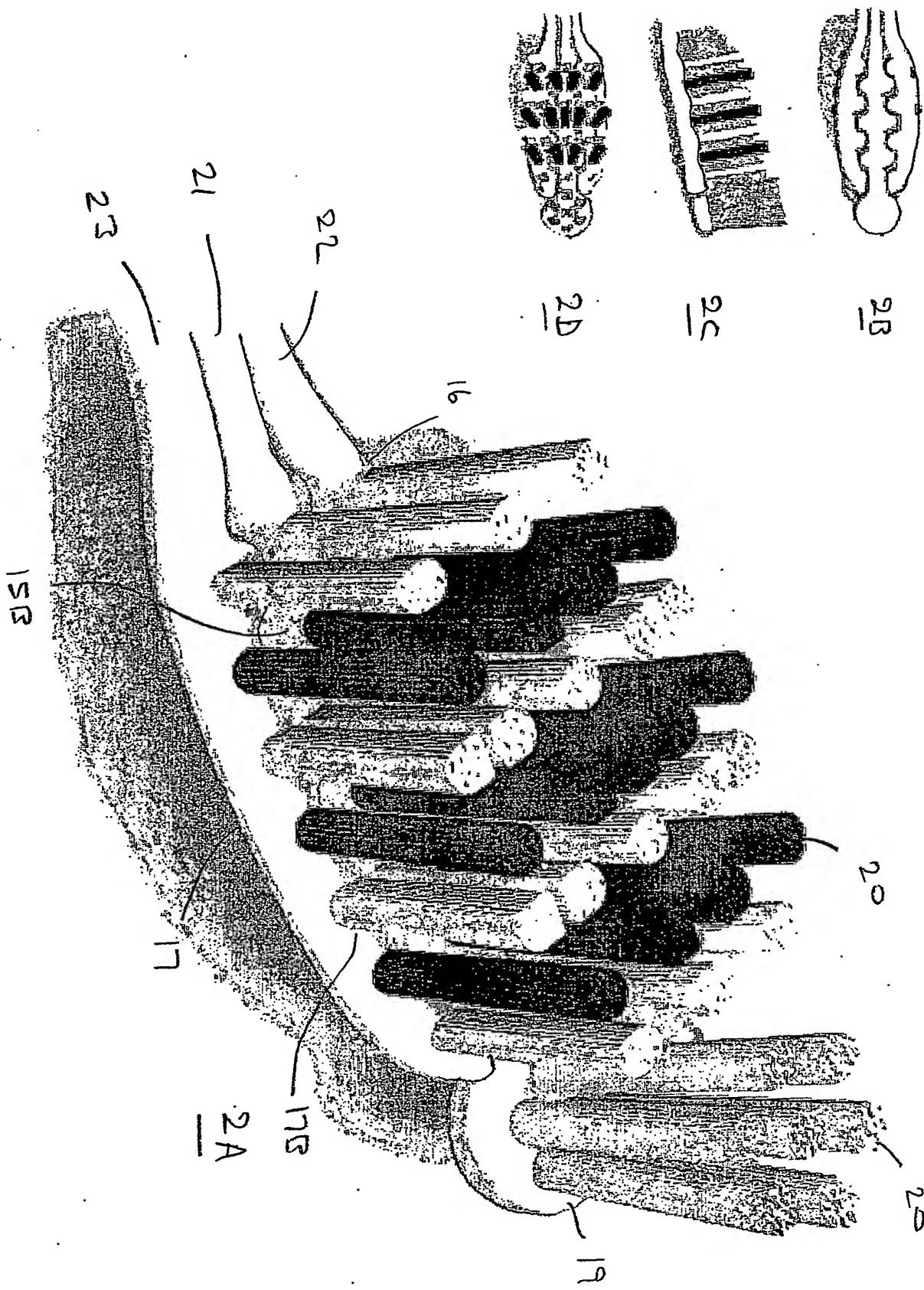


Fig. 1

Fig. 2



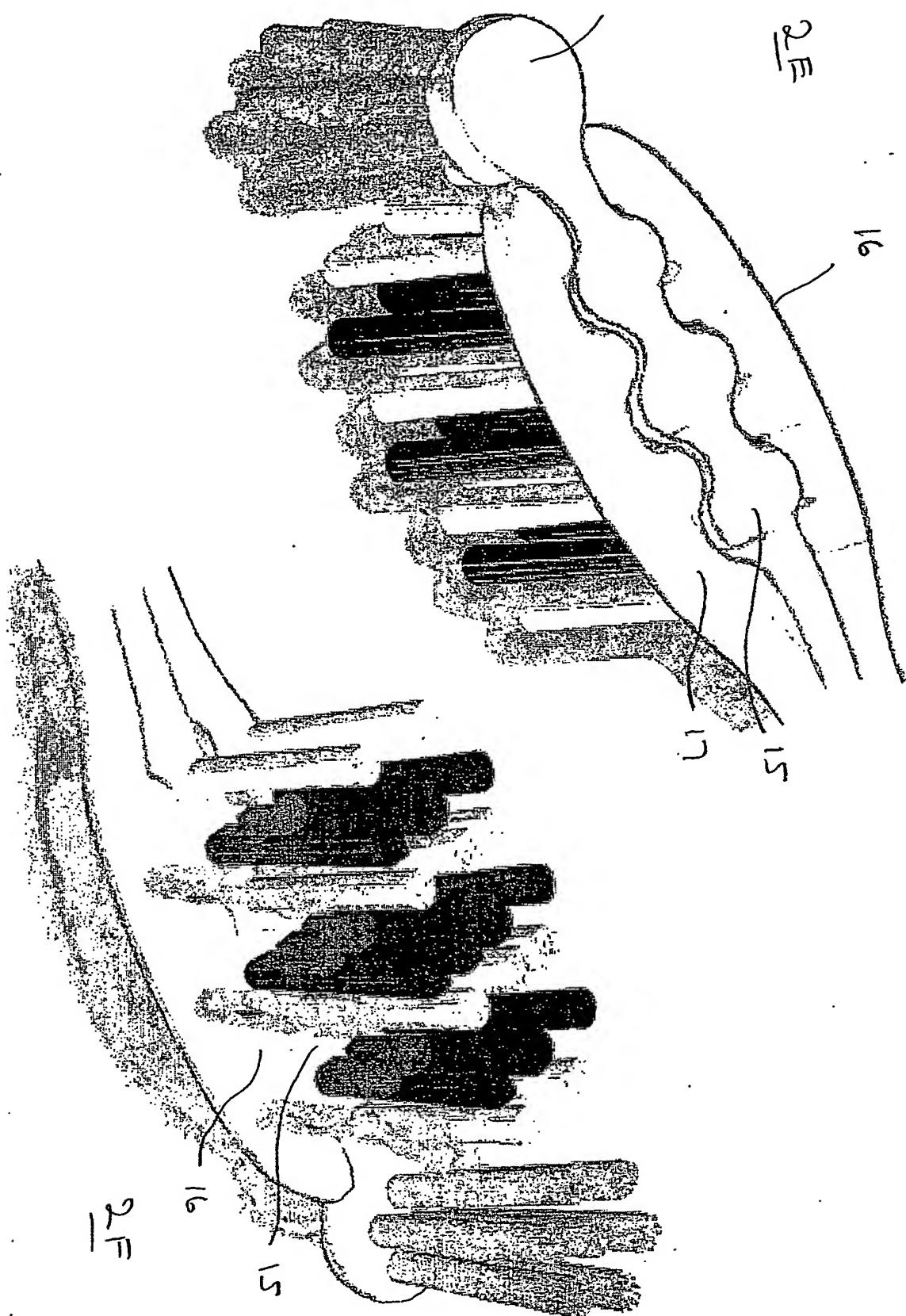


Fig. 2

15B

17



16

3B

—

20



3C

3D

B

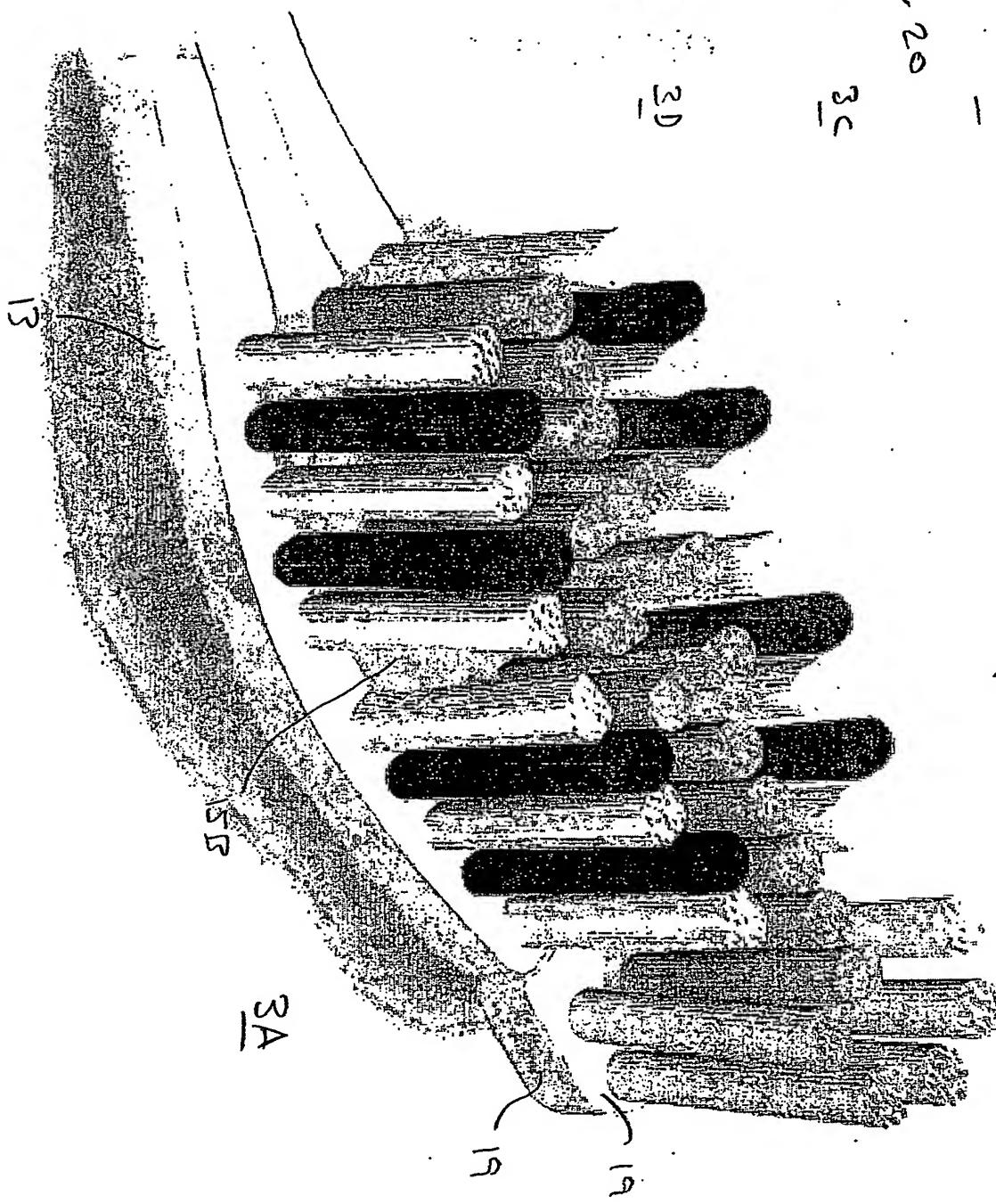


Fig. 3

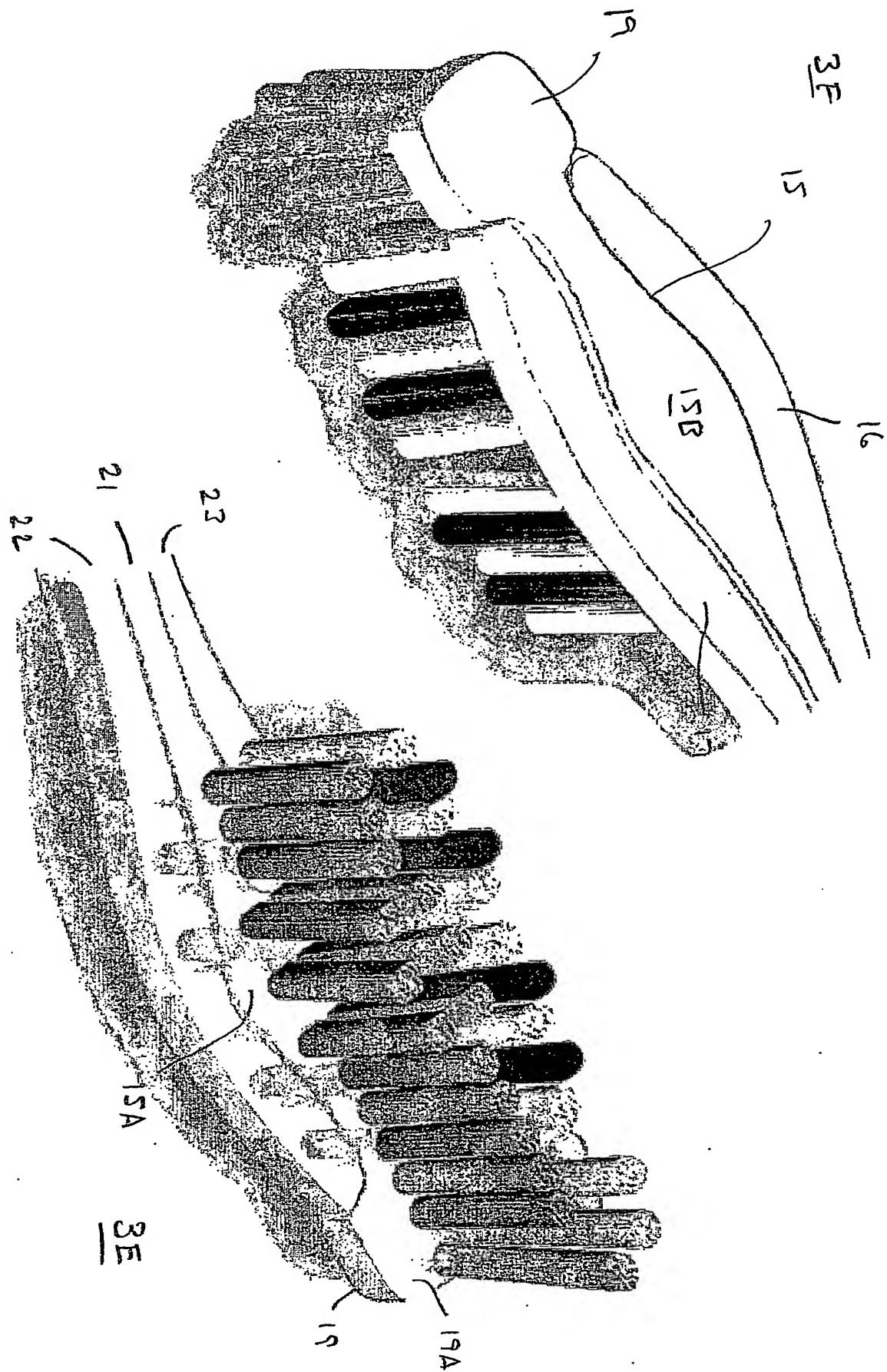
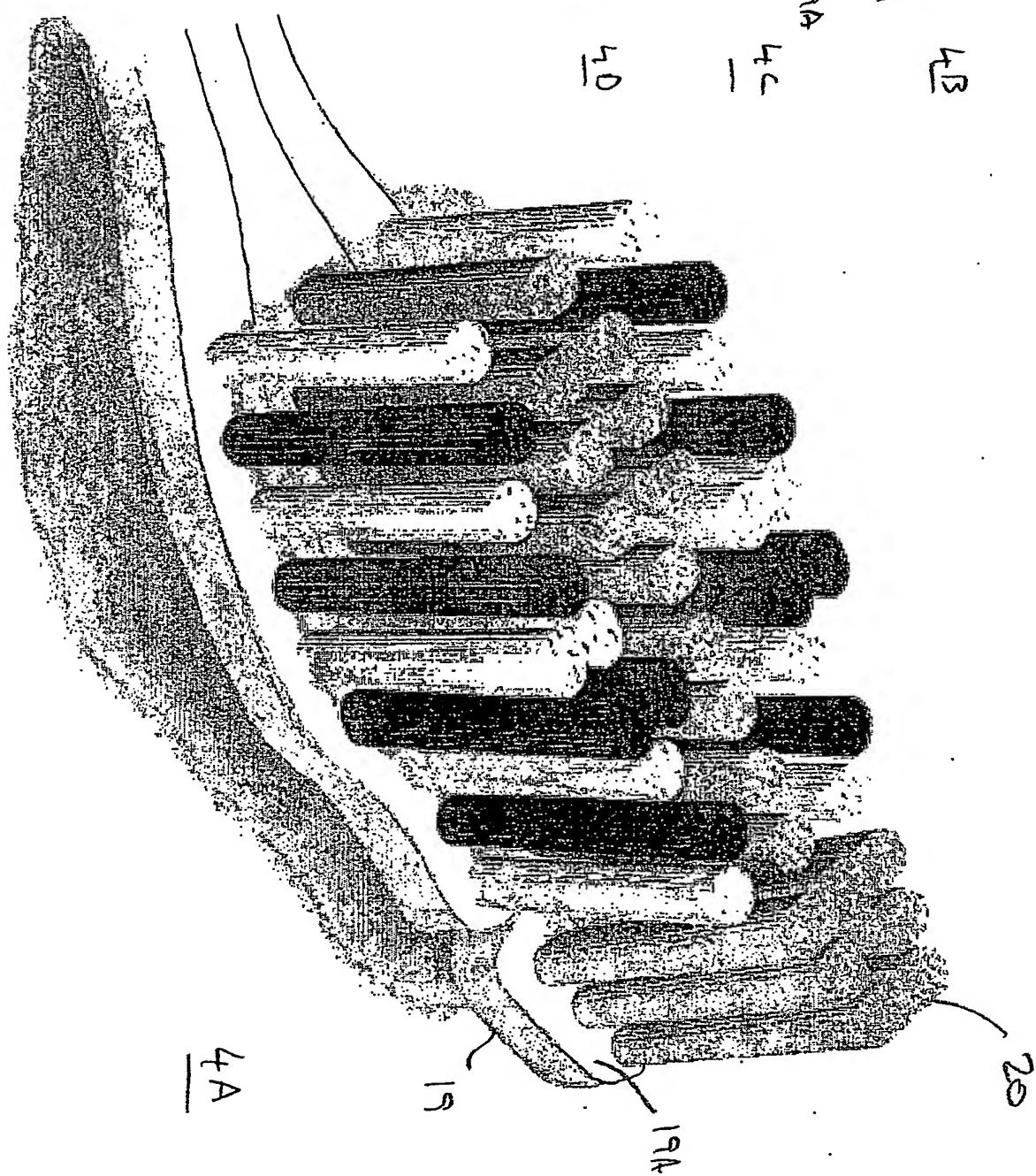


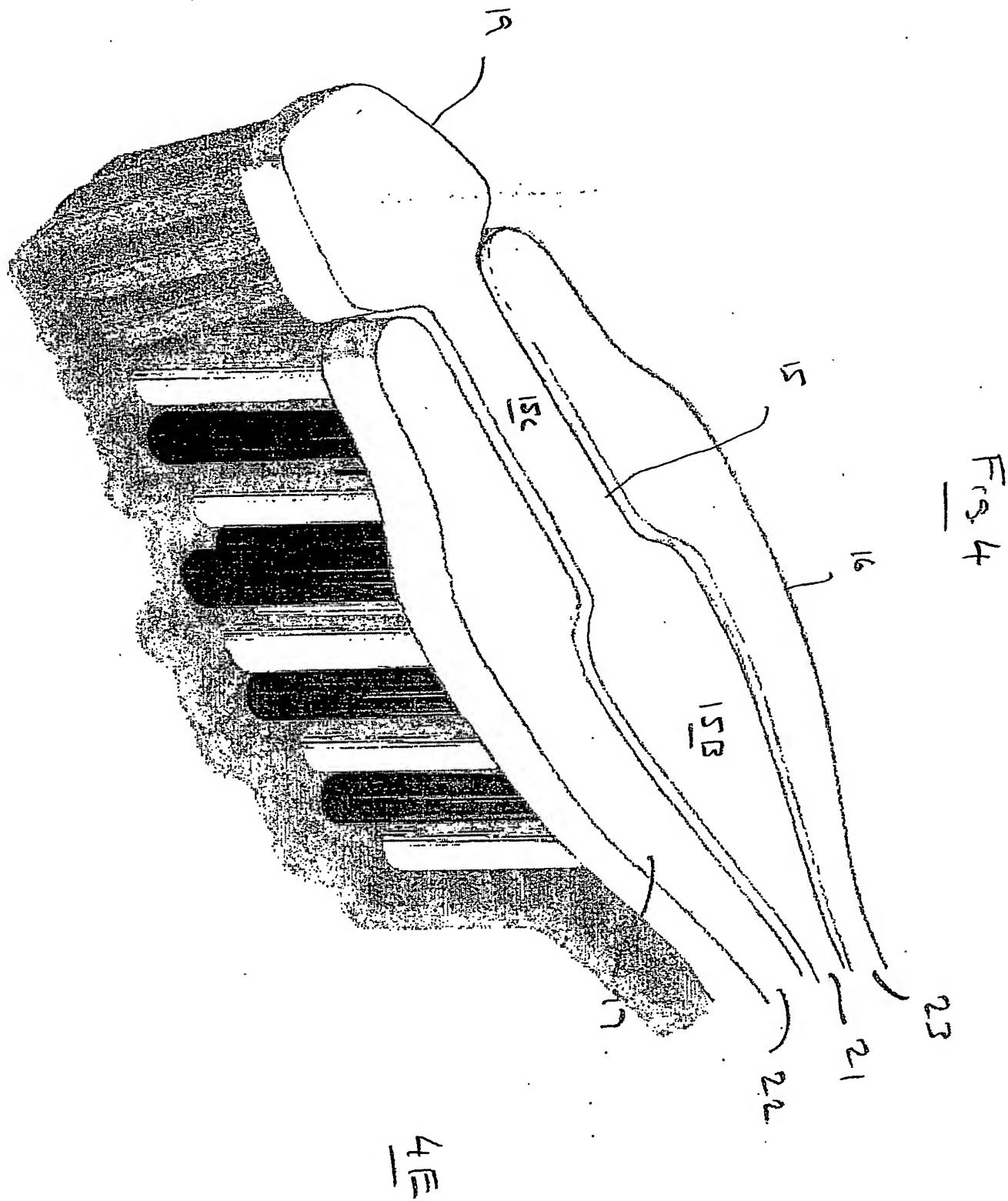
Fig. 3



15B

15C

FIG. 4



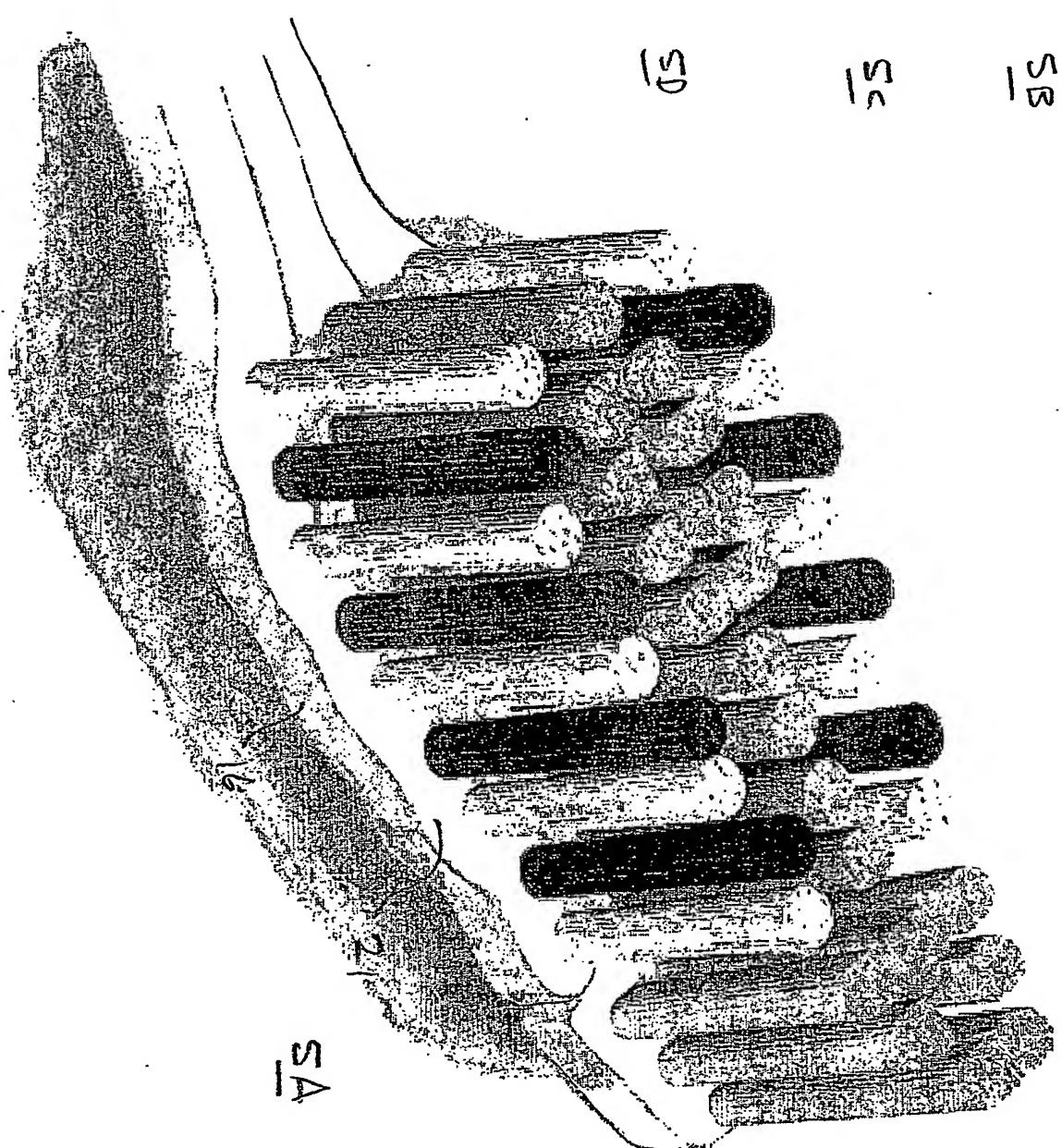
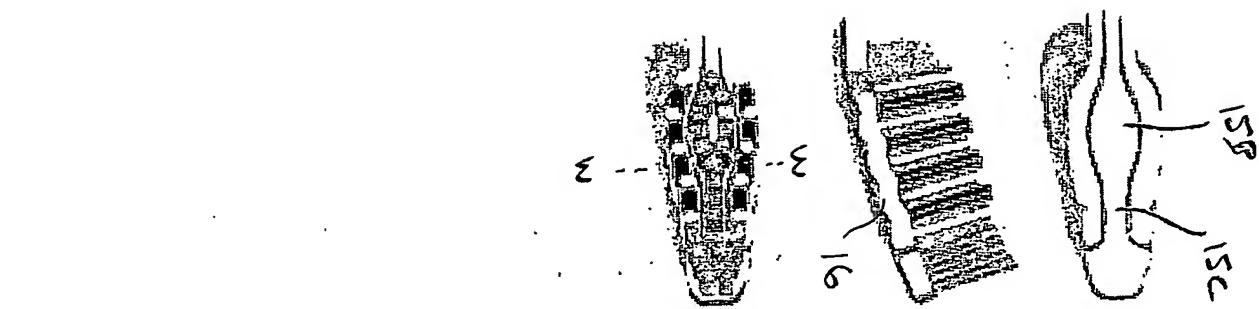


Fig. 5

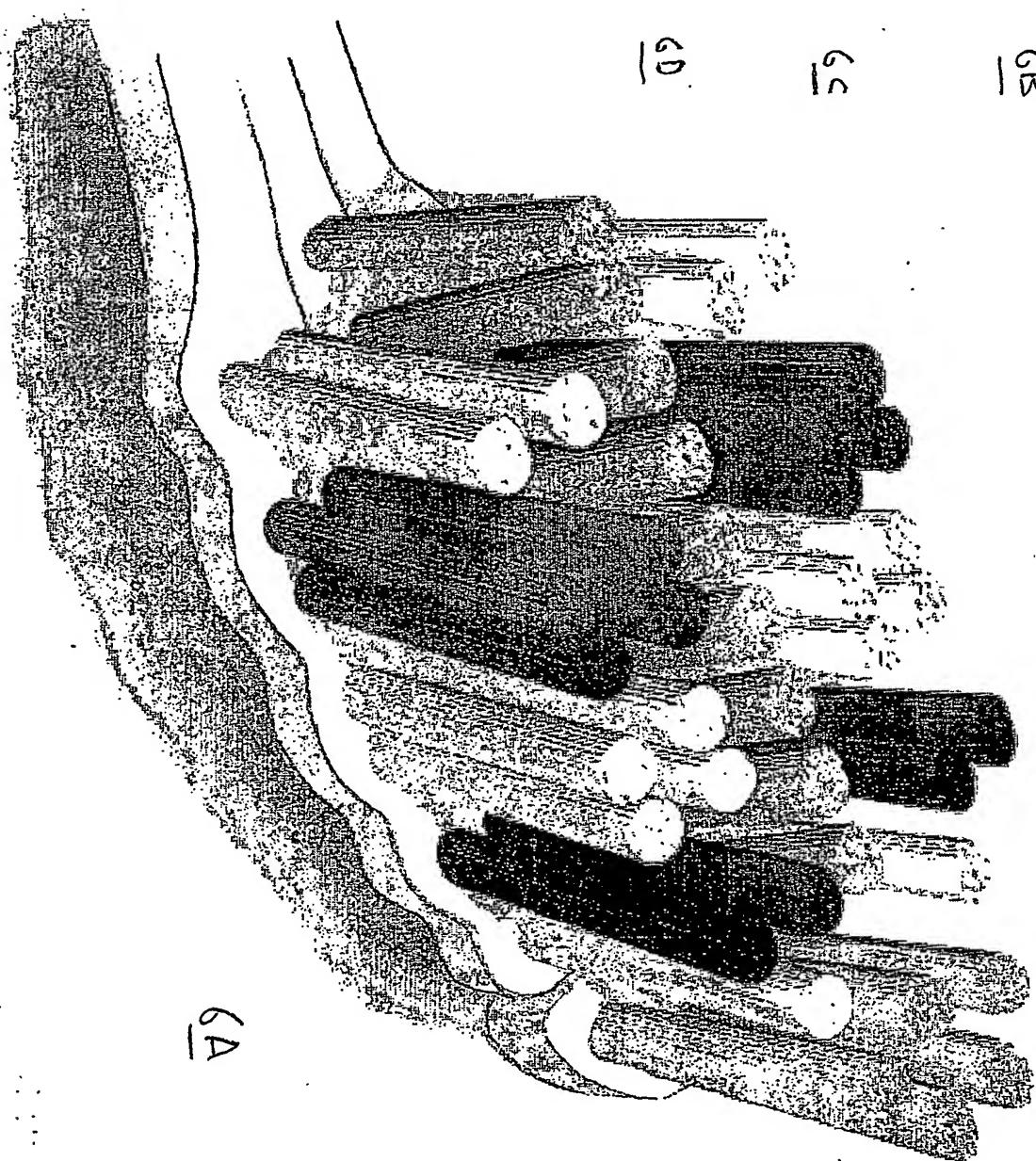


Fig. 6

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